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IS 11362 (1985): Head configuration and gauging of countersunk head screws [PGD 31: Bolts, Nuts and Fasteners Accessories]

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IS : 11362-1985
ISO 7721-1983

Indian Standard (Reaffirmed 2001)

HEAD CONFIGURATION AND GAUGING OF COUNTERSUNK HEAD SCREWS

(ISO Title : Countersunk Head Screws — Head Configuration and Gauging)

Bolts, Nuts and Fastener Accessories Sectional Committee, EDC 27 [Ref : Doc : EDC 27 (4524)]

National Foreword

This Indian Standard, which is identical with ISO 7721-1983 'Countersunk head screws — Head configuration and gauging', issued by the International Organization for Standardization (ISO), was adopted by the Indian Standards Institution on the recommendation of the Bolts, Nuts and Fastener Accessories Sectional Committee and approved by the Engineering Division Council.

In the adopted standard certain terminology and conventions are not identical with those used in Indian Standards; attention is specially drawn to the following :

Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use full point (.) as the decimal marker.

Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

Adopted 31 May 1985

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Gr 2

INDIAN STANDARDS INSTITUTION
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1 Scope and field of application

This International Standard specifies the characteristics of head configurations of slotted and recessed countersunk head screws, and recommends a gauging method for the head dimensions laid down in the respective product standards.

2 Head configuration

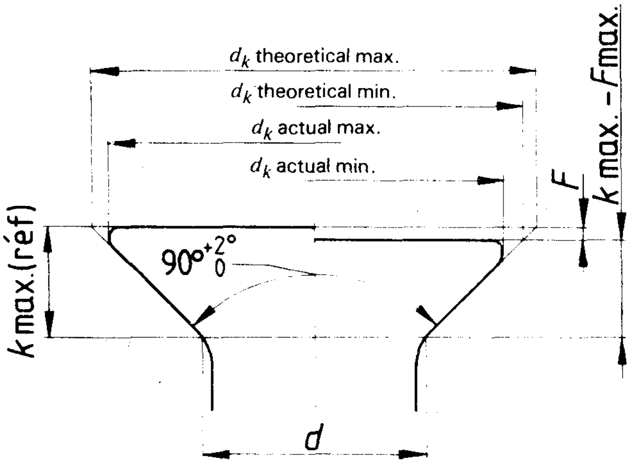


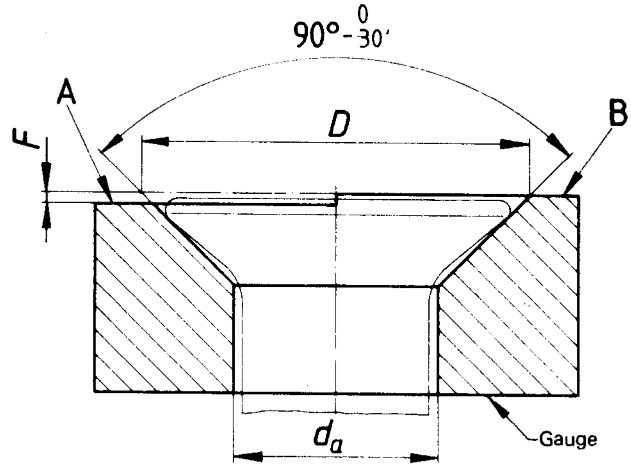
Table 1

Dimensions in millimetres

Thread size, *d*		metric	**M 1,6**	**M 2**	**M 2,5**	**M 3**	**M 3,5**	**M 4**	**M 5**	—	**M 6**	**M 8**	**M 10**	**M 12**	**M 14**	**M 16**	**M 18**	**M 20**
		tapping	—	**ST 2,2**	—	**ST 2,9**	**ST 3,5**	**ST 4,2**	**ST 4,8**	**ST 5,5**	**ST 6,3**	**ST 8**	**ST 9,5**	—	—	—	—	—
d_k	theoretical	max.	3,6	4,4	5,5	6,3	8,2	9,4	10,4	11,5	12,6	17,3	20	24	28	32	36	40
		min.	3,3	4,1	5,1	5,9	7,7	8,9	9,8	10,9	11,9	16,5	19,2	23,1	27	30,8	34,7	38,5
	actual	max.	3	3,8	4,7	5,5	7,3	8,4	9,3	10,3	11,3	15,8	18,3	22	25,5	29	32,5	36
		min.	2,7	3,5	4,4	5,2	6,9	8	8,9	9,9	10,9	15,4	17,8	21,5	25	28,5	31,9	35,4
F		max.	0,15	0,15	0,2	0,2	0,25	0,25	0,3	0,3	0,35	0,4	0,4	0,45	0,5	0,6	0,65	0,75
k max. (ref.)		metric	1	1,2	1,5	1,65	2,35	2,7	2,7	—	3,3	4,65	5	6	7	8	9	10
		tapping	—	1,1	—	1,7	2,35	2,6	2,8	3	3,15	4,65	5,25	—	—	—	—	—

3 Gauging method

Flushness gauge
for the head height



The top surface of the screw head must lie between gauge surfaces A and B.

Ring gauge
No go gauge for d_k actual min.

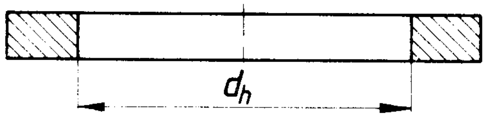


Table 2

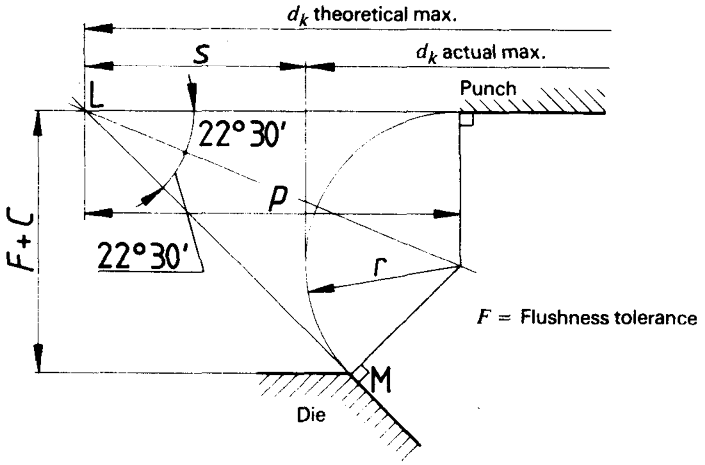
Dimensions in millimetres

Thread size, *d*	metric	**M 1,6**	**M 2**	**M 2,5**	**M 3**	**M 3,5**	**M 4**	**M 5**	**—**	**M 6**	**M 8**	**M 10**
	tapping	—	**ST 2,2**	—	**ST 2,9**	**ST 3,5**	**ST 4,2**	**ST 4,8**	**ST 5,5**	**ST 6,3**	**ST 8**	**ST 9,5**
D	max.	3,6	4,4	5,5	6,3	8,2	9,4	10,4	11,5	12,6	17,3	20
	min.	3,55	4,35	5,45	6,25	8,15	9,35	10,35	11,45	12,55	17,25	19,95
d_a	max.	1,84	2,36	2,74	3,3	3,9	4,4	5,5	5,68	6,6	8,54	10,62
	min.	1,74	2,26	2,64	3,2	3,8	4,3	5,4	5,58	6,5	8,44	10,52
F	max.	0,15	0,15	0,2	0,2	0,25	0,25	0,3	0,3	0,35	0,4	0,4
	min.	0,14	0,14	0,19	0,19	0,24	0,24	0,29	0,29	0,34	0,39	0,39
d_h	min.	2,68	3,48	4,38	5,18	6,88	7,98	8,88	9,88	10,88	15,38	17,78
	max.	2,7	3,5	4,4	5,2	6,9	8	8,9	9,9	10,9	15,4	17,8

NOTE — Diameters d_a min. are based on fillet radius $r = 0{,}25\ d$ for metric screws and $0{,}4\ d$ for tapping screws.

Annex

Calculation basis for the maximum head diameter of countersunk heads for screws



Basic assumptions

1. When heads are being formed with minimum heights, the clearance between punch and die will have minimum values C as follows:

Thread size, d	metric	M 1,6	M 2	M 2,5	M 3	M 3,5	M 4	M 5	–	M 6	M 8	M 10
	tapping	–	ST 2,2	–	ST 2,9	ST 3,5	ST 4,2	ST 4,8	ST 5,5	ST 6,3	ST 8	–
C	min.	0,2	0,22	0,28	0,3	0,32	0,35	0,38	0,4	0,42	0,5	0,63

2. When heads are being formed with maximum heights and maximum actual diameters, the peripheral contour of the head and the clearance between punch and die will be as shown in the above diagram.

From the diagram:

$$s = p - r$$

but $p = \mathrm{LM} = (F + C) \sec 45^\circ$
and $r = \mathrm{LM} \tan 22^\circ 30' = (F + C) \sec 45^\circ \times \tan 22^\circ 30'$

$$\begin{aligned} s &= (F + C) \sec 45^\circ - (F + C) \sec 45^\circ \times \tan 22^\circ 30' \\ &= (F + C)(\sec 45^\circ)(1 - \tan 22^\circ 30') \approx 0{,}83\,(F + C) \end{aligned}$$

d_k actual max. = d_k theoretical max. $- 2s$ = d_k theoretical max. $- 1{,}66\,(F + C)$

It is also assumed that the relationship between theoretical and actual diameters is roughly constant:

d_k actual min. $\simeq$ d_k theoretical min. $-$ (d_k theoretical max. $-$ d_k actual max.)

where d_k theoretical min. = d_k theoretical max. $- 2\,F$.

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